IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of:

Naohiko KIKUCHI et al. Group Art Unit: 1733

Serial Number: 10/606,358 Examiner: MAKI, STEVEN D

Filed: June, 26, 2003

For: STUDLESS TIRE

DECLARATION UNDER 37 CFR 1.132

Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Sir:

Naohiko Kikuchi residing at 1-5-3-409, Ibukidainishimachi, Nishi-ku, Kobe-shi, Hyogo-ken, Japan duly deposes and says:

1. That he graduated from Department of Polymer Science and Engineering, Faculty of Science, Hokkaido University, Hokkaido, Japan, in the year 1987;

2. That since 1987, he has been employed in the capacity of Sumitomo Rubber Industries, Ltd.;

3. That from 2001 he has been engaged in development for rubber composition for tire, development for new polymer, new silica and new silane coupling agent, development for side reinforced layer for run flat tire. etc.;

4. That he has read and is familiar with the instant application for United States Letters Patent and Office Action thereto mailed June 1, 2005.; and

5. That he has made experiments in order to show that a studless tire having a tread comprising diene rubber and short glass fiber which is surface-treated in advance and dispersed in said diene rubber so as to be oriented in the tread thickness direction is extremely excellent in breaking performance on ice.

Experiments 1 to 4

The material used in Experiments 1 to 4 and the method of evaluation of the obtained tires are described below. In addition, the method of evaluation is evaluated in the same condition of EP 1,072,446.

Natural rubber: RSS #3 grade

Polybutadiene having high cis structure: UBEPOL BR150B available from Ube Industries, Ltd.

N220: SHOWBLACK N220 available from Showa Cabot Co. Ltd.

Silica: Nipsil VN3 available from Nippon Silica Co., Ltd.

Paraffin oil: Diana Process oil available from Idemitsu Kosan Co., Ltd.

Wax: SUNNOC N available from Ouchi Shinko Chemical Industrial Co. Ltd.

Antioxidant: NOCRAC 6C available from Ouchi Shinko Chemical Industrial Co., Ltd.

Stearic Acid: Stearic acid available from NOF Corporation

Zinc oxide: Zinc Oxide type 2 available from Mitsui Mining and Smelting Co., Ltd.

Silane coupling agent: Si69 (bis(3-triethoxysilylpropyl)tetrasulfide) available from Degussa Co.

Sulfur: powdery sulfur available from Tsurumi Chemicals Co., Ltd.

Vulcanization Accelerator: Nocceler CZ available from Ouchi Shinko Chemical Industrial Co. Ltd.

Glass fiber A: average fiber diameter 11 μm, average length 3 mm, not treated by surface treating agent which improves adhesion to rubber

Glass fiber B: average fiber diameter 11 μm, average length 3 mm, treated by sulfur containing mercaptosilane

(Complex elastic modulus)

The complex elastic modulus was measured by using a viscoelasticity spectro meter made by Iwamoto Seisakusho under the predetermined measuring conditions at 25 °C, measuring frequency of 10 Hz, initial strain of 10 %, dynamic strain of 1%.

As a sample, a rubber piece having a thickness of 1.0 mm, a width of 4 mm and a length of 5 mm was cut out from the tire tread portion and used for measurement.

(Braking performance on ice)

Tire size: 195/65R15

A Japanese FR vehicle of 2,000 CC was used as a test vehicle. The stopping distance from a speed of 30 km/h on an ice covered plate was measured, and the braking performance was calculated from the following equation using Experiment 4 as reference.

(Stopping distance in Experiment 4) / (stopping distance) × 100

The greater the index becomes, the better the braking performance becomes. Before each test was carried out, the vehicle

was run for 200 km in each case.

(Abrasion resistance)

Tires having the size of 195/65R15 were mounted to a Japanese FF vehicle and the vehicle was run for 4,000 km. Then the depth of groove of each tire tread position was measured, and the running distance in which the depth of the tire groove was reduced to 1 mm was calculated and indexed according to the following formula: (running distance in which depth of tire groove is reduced to 1 mm) / (running distance in which depth of tire groove in Experiment 4 is reduced to 1mm) × 100

The greater the index becomes, the better the abrasion resistance becomes.

(Harness of rubber)

The hardness of the rubber was measured according to JIS A at a temperature of 10 °C,

By using the rubber compositions shown in Table A, a tire in which the staple fibers were oriented in the circumferential direction of the tread was formed using a conventional extrusion method. Also a tire in which the staple fibers were oriented in the thickness direction of the tread was formed using the method shown in Figure 2 described in EP1,072,446. In the method shown in Figure 2 described in EP1,072,446, the tread shown in the drawing described in EP1,072,446 was formed by using a rubber composition blended with staple fibers which was rolled by a calendar roll into a thickness of 1

mm and a width of 1.5 m, and then by repeating folding it.

By using the obtained tire, the evaluations were carried out. The evaluations were carried out. The result is shown in Table A.

Table A

	Experiment 1	Experiment 2	Experiment 3	Experiment 4
Natural rubber	60	60	60	60
High-sys polybutadiene	40	40	40	40
N220	45	45	45	45
Silica	20	20	20	20
Paraffin oil	25	25	25	25
Wax	2	2	2	2
Antioxidant	1.5	1.5	1.5	1.5
Stearic acid	2	2	2	2
Zinc white	3	3	3	3
Glass fiber A	-	-	5	5
Glass fiber B	5	5	-	-
Silane coupling agent	1.2	1.2	1.2	1.2
Sulfur	1.5	1.5	1.5	1.5
Vulcanization accelerator	1	1	1	1
Average length of staple fibers (mm)	0.5	0.5	0.5	0.5
Method for forming tread	Method of Fig. 2	Conventional extrution	Method of Fig. 2	Conventional extrution
Complex elastic modulus E1	6.1	4.5	6.1	4.3
Complex elastic modulus E2	4.4	6.2	4.3	6.0
E1/E2	1.39	0.73	1.42	0.72
Braking performance on ice	131	109	119	100
Abrasion resistance	118	114	111	100
Hardness of rubber (-10 °C)	62	61	61	60

Result and Discussion

As evident from the results of Table A, braking performance on ice of Experiment 1 which contains glass fiber B which is

surface-treated in advance and dispersed in diene rubber so as to be oriented in the tread thickness direction is 131.

On the other hand, braking performance on ice of Experiment 2 which contains glass fiber B and dispersed in conventional extrusion and that of Experiment 3 which contains glass fiber A which is not surface-treated in advance and dispersed in diene rubber so as to be oriented in the tread thickness direction are 109 and 119, respectively.

Therefore, a studless tire having a tread comprising diene rubber and short glass fiber which is surface-treated in advance and dispersed in said diene rubber so as to be oriented in the tread thickness direction is extremely excellent in breaking performance on ice.

The undersigned declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

This 17th day of January, 2008

by Naohiko Kikuchi

Naohiko Kikuchi

We, the undersigned witnesses, hereby acknowledge that Naohiko Kikuchi is personally known to us and did execute the foregoing Declaration in our presence on:

Date: January 17, 2008 Witness Yoshiaki Someya

Date: January 17, 2008 Witness Naoki Fujii